Miller

Drowning

PAPERS

IN

MECHANICS.

The GOLD MEDAL *of the Society was this Session voted to* JOHN MILLER, *Esq. of Bedford, for his Methods of Raising the Bodies of Persons who have sunk under Water, or of assisting Persons in Danger in Water. The following Communication was received from him; explanatory Engravings are annexed, and Models of the different Implements, with Drawings shewing their mode of Application, are preserved in the Society's Repository.*

SIR,

WITNESSING, as many others did, a boy losing his life in the river in this place, for want of an expeditious means of finding and recovering his body when sunk, I wrote to and waited on Dr. Hawes, requesting him to procure for me whatever were the proper and most approved machines for that purpose. He purchased for me two sets of the Royal Humane Society's Apparatus for Reanimation; two of Daniel's

Daniel's Life Preservers; one of the Society's Rope Drags; and one of Dr. Cogan's Pole-Drags; pointing out this last as the most approved and most efficacious machine then in use: and he gave me a sketch of a bar-drag, armed with tenter-hooks, and weighted with a bar of iron, to which the rope for drawing it was to be fastened.

As soon as I had received it, I went with a medical gentleman, who had been eye-witness to the fatal catastrophe, and who assisted in searching for and taking out the boy, (consequently knew the precise spot wherein he fell, and where he was found, which was within three feet of where he fell) to try the efficacy of Dr. Cogan's drag. The boy fell from off the bridge whilst fishing, and so far distant from the shore as to render a boat necessary for us to reach the spot. The depth of the water was ten feet, and we found a difficulty from the buoyancy of the pole in Dr. Cogan's drag, in forcing it to the bottom, and when we did, the stones, or whatever it met with, so favoured its buoyancy as to toss it up considerably when drawing forwards, and it required the force of both hands to keep it down so as to scrape the bottom with it. The result was, that the force the person holding the drag was obliged to use to counteract the buoyancy of its pole (added to the weight and resistance of the water against it) overpowered the means of the person who had the guidance of the boat, to move it in the direction he wished; and instead of the movement of the boat directing the drag (or rather the person holding it) the drag, by the force required to keep it at the bottom, and by the weight and resistance of the water acting on its pole, governed the boat, and was as it were an anchor to it, confining the efforts of the person standing in it and using the drag, and making the action of the drag stationary instead of progressive.

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The extreme scope of this drag not exceeding eighteen inches, may it not require too much time to traverse the uncertain space wherein the object to be searched for lies, to insure its success? The bar-drag, of which Dr. Hawes gave me the sketch, in point of extent and its consequent expedition might answer where the bottom is level, and no ridges or hollows would occur; but, as being a straight piece of wood, it can accommodate itself to no unevennesses, consequently must leave holes, the most likely repository of the object sought for, unsearched.

One cannot but be aware that it will seldom happen that the precise spot can be ascertained, either from the current of the water, the confusion or difference of opinion among spectators, the space to be searched is generally considerable and uncertain. Adverting, therefore, to what Dr. Hawes had sent me, and to the conversation I had with him, as well as the enquiries I had made, I thought something was still wanting; and the desideratum appeared to me to be a machine that would be expeditious, because it was extensive; and secure, because by accommodating itself to the ground, however uneven, it would search holes and hillocks equally. I turned my mind, therefore, to form a machine of this description, and thinking that the buoyancy of the wood would take off from the weight of lead and iron about it, were I to extend it to ten feet in length, I determined on that length for it, and I found my expectation realised in the result. I therefore denominated it a machine or drag, easily drawn by one person, that fishes an extent of ten feet at one sweep, with the certainty of finding a body, if it lies within that space, let the ground be ever so uneven, or the water ever so deep. *Vide Reference and Engravings.*

Permit me, Sir, to request you to submit this account of my machine to the Society of Arts, &c. accompanied with models

models and a drawing, and should they be honoured with the approbation of the Society, I shall feel myself much gratified, as their sanction could not fail to promote their publicity.

I have the honour to be,

Sir,

Your most obedient servant,

JOHN MILLER.

Bedford, Feb. 28, 1809.

To C. Taylor, M.D. Sec.

Reference and Description of Mr. Miller's Apparatus for Raising the Bodies of Persons sunk under Water. Pl. III. IV. Fig. 1, 2, 3, 4.

This machine consists of a round piece of deal A A, fig. 1, ten feet in length, and two inches and an half in diameter; at thirteen inches from each end of it, a square piece of deal B, twelve inches in length, and one inch and an half in diameter, made firm by a bracket, is let in and glued or nailed. To this bar four six-pointed drags, C C C C, are suspended at equal distances. These drags are weighted with two pounds of lead affixed or run on to the lower end of their shafts or stems, to steady them when in action, and to keep their points from running into the ground, which had they nothing to counteract their weight and preponderancy at top, they would do. The buoyancy of the bar on the one hand, and the weight of the lead at the bottom of the drags on the other, has the effect of keeping the drags in

Mr. Miller's apparatus, for raising the Bodies of Persons, sunk under Water.

Fig. 1.

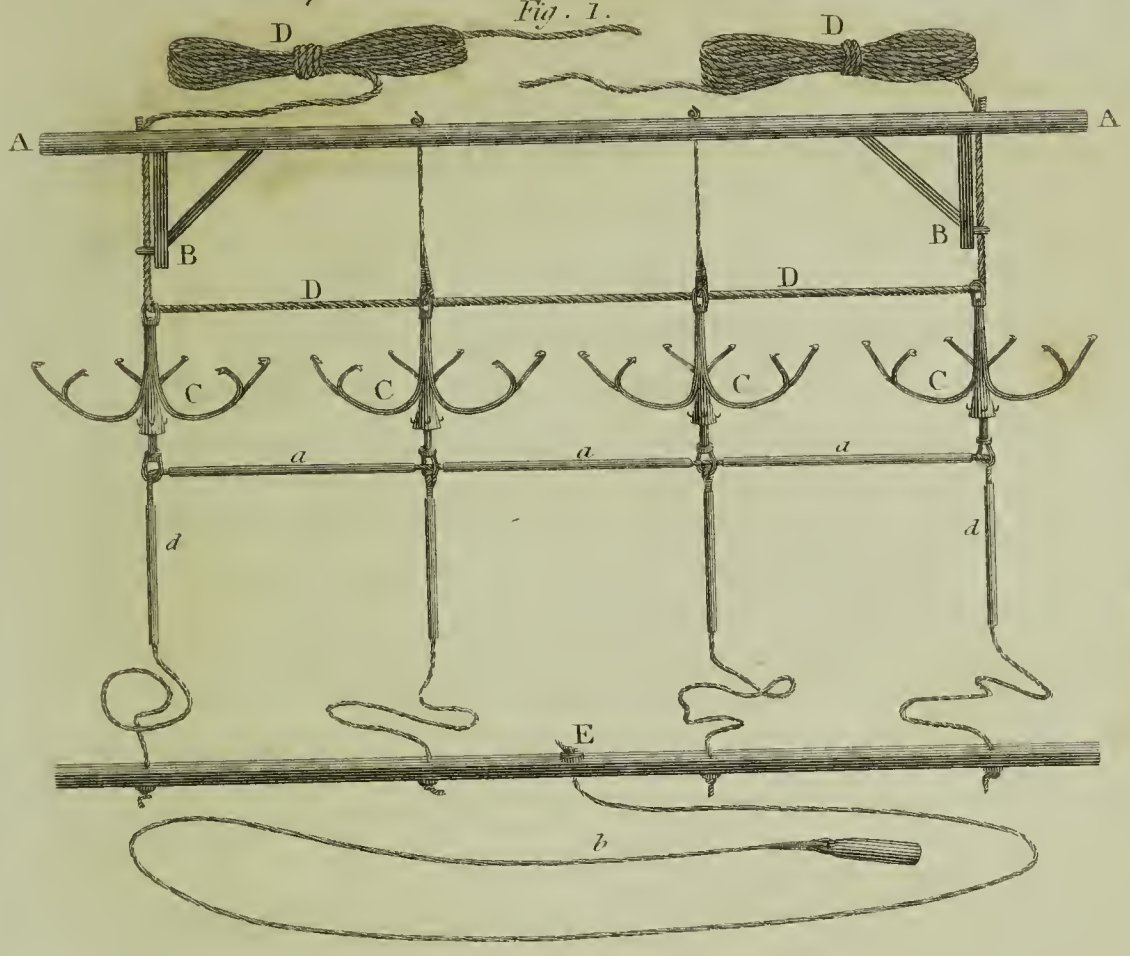


Fig. 2.

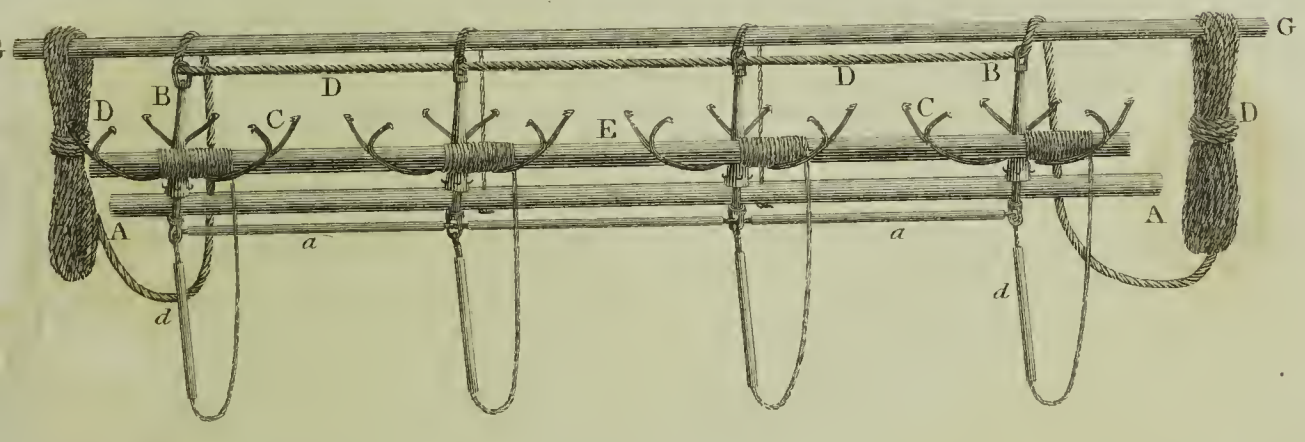


Fig. 3.

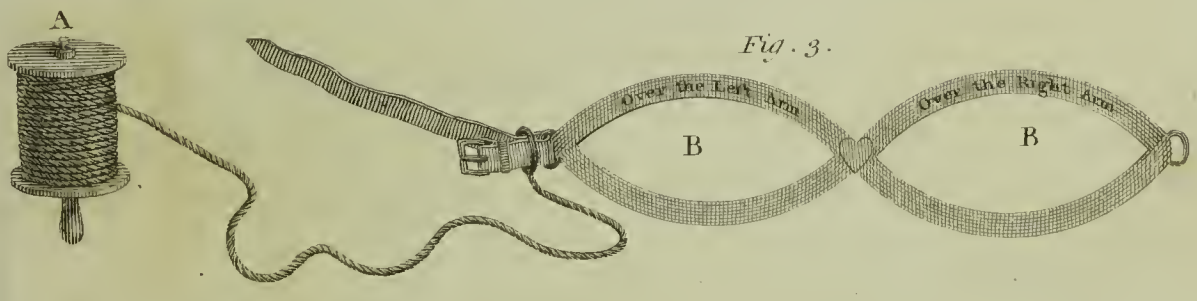
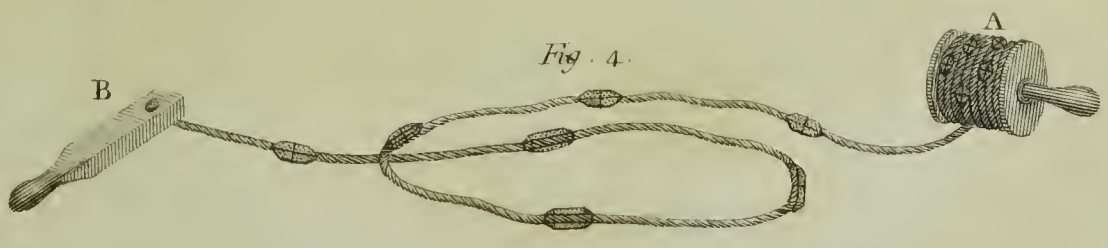


Fig. 4.



Engraved by S. Porter sc.

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in an upright position when at rest in the water, and in a diagonal one when pulled forward, scraping the ground, but not entering it. Each drag, as shewn in Pl. IV. fig. 7, has a swivel at both ends of its shaft or stem. Its whole length, including swivels, is about nineteen inches. At nine and a half inches from the top, the hooks, which are three only at their base, but which are subdivided at eight inches from their ends, take their rise. They are curved, and their points when turned up again are about four inches below the level of their tops, and thirteen inches asunder; and the outside point of each sub-division is thirteen inches from its adjoining one. The extreme points are split and formed into a double hook, very sharp and pointing towards the stem.

Holes are bored through the bar A at equal distances, so as the hooks when suspended may approach each other within five inches. Through those at the end, which are larger than the others, and made close to the pieces of wood let into the bar, the principal or drawing ropes D D pass. This rope is of considerable length and strength, and goes through the top-swivels of all the drags. It is then made fast by wooden wedges driven into the holes through which it passes, at such a length as will suspend the two end drags a few inches below the end of the pieces of wood let into the bar. The other three drags are suspended at the same distance from the bar by lines of an equal length coming through the holes in the bar, and tied to their top-swivels. These three drags, as well as the two end ones, are made fast to the principal or drawing rope at equal distances with a piece of tar-line tied to their top-swivels. And the two outside drags are kept in their proper situation by the principal rope going through a staple fixed in the pieces of wood let into the bar, and the two others are kept either

from

from approaching or entangling with one another, or the outside ones, by bored pieces of wood, *a a*, of equal lengths placed between each drag at the bottom, through which and their bottom swivels a rope made fast to the bottom swivels of the two outside drags passes. The drags, however tied or fastened their swivels may be, always have their own rotary motion free, consequently their points by their own gravity will always assume and retain their proper position when in action. The bar clears the way for the drags, breaking and removing weeds or what else might otherwise impede their progress and action. The drags, being suspended to the bar and separated from each other by nothing but what will give way, are undulatory in their progress as the bottom is, but will yet preserve the full extent of their sweep.

Thus formed, the machine is ready for use, and may be drawn in this shape backwards and forwards at pleasure; but should the water wherein it is to be used be thought to contain roots of trees, or any thing likely to occasion the necessity of drawing up or releasing any one of the drags from the obstacle it has met with, then another appendage is advisable: a bar E, less in substance than the leading one, but of the same length, and which, for distinction sake, I call the floating-bar. Holes are made through this bar at the same distance from each other as those in the leading bar, and ropes of equal length (either ten feet, or any other length that may be chosen) after having been tied to the bottom swivels of all the drags are to be brought through these holes, and there stopped, either by a knot or pieces of cork at their ends. By this means any particular drag may be got at, without altering the position of the others, for, as far as the flexibility of the rope in the intermediate spaces between the several drags will admit, each is free and independent of the other;

and

and since, by means of these ropes, a parallelism is preserved from the leading-bar to the floating-one, the floating one of course brings into view the direction the one which is sunk is taking.

Should the current of water be strong, it would carry the floating-bar before the leading one in drawing down stream. A rope *b*, therefore, weighted with a stone or piece of lead at its end, is requisite. This will act as a kind of anchor to it, will steady it, and keep it where it ought to be, behind the leading one. If bored pieces of deal *d d*, 15 inches long, are, after passing the ropes of the floating-bar through them, made fast by wooden wedges to those ropes, at three inches distance from the bottoms of the drags, they will by their buoyancy and tension prevent these ropes of the floating-bar entangling round the points of the drags.

With the floating-bar attached to it, the progress of the bar cannot be instantly changed from straight forward to retrograde. For without making a sweep something circuitous, the ropes would entangle. But if a rope is fastened either to the middle of the floating-bar, or to that rope which operates as an anchor to it, by means of that the whole machine may be drawn back, and the same sweep repeated as often as required.

Should the floating bar, for the purpose of disengaging any particular drag be thought unnecessary, but that it is desirable to know what direction the one sunk is taking, and that the drawing backwards and forwards is an object, the floating-bar, provided the holes at the ends of it are made sufficiently large, will do this by changing its direction from being a following bar into that of a leading one by this means. Detach it from the drags by untying its ropes from the bottom swivels. Pull them out of the floating-bar, and then pass the two ends of the principal or drawing rope

through

through the holes next the ends of it, and let it slip down to the leading-bar; its own buoyancy will bring it to the surface of the water, and the operation of a man's pulling the drawing rope, will, by compression, keep it there.

The cost of this drag and appendages is three guineas.

Plate III. fig. 2, represents the drag in the state in which it should be preserved ready for use, or the manner in which it should be carried from place to place, to prevent any part from entangling. G G is a pole over which that part of the apparatus marked A and B is laid, and on which the cords D D folded up are hung, the drags C C C C remain suspended on the nearer side of the pole, and the floating-bar E is laid within the drags with the hollow tubes *d d* below it.

Plate IV. fig. 7, shews one of the drags separate from the rest of the apparatus, with the dimensions of each part of the drag on an enlarged scale.

So closely connected with this subject of life preservation are two other machines which I have had made, that, on the presumption that a description of them will not be unacceptable, I shall annex it.

One of them I call the Reel Safeguard, devised by me for the security of persons going to the assistance of a drowning person, or diving for them.

The other a Missile Rope, capable of being flung to a person in distress, at a considerable distance from the shore.

This missile rope, (fig. 4, plate III.) 35 yards in length, is rendered buoyant by pieces of cork fastened to it, at intervals of three or four feet. It is made fast at one end to a wooden reel A, six inches in diameter, and sixteen in length, on which it should always be kept wound, to prevent the ropes kinking, and for being in readiness. But when used, it must be unwound, because the corks are an obstacle to its running off the reel in the throw, and it

should

should be spread on the ground, or held in the hand, free from entanglement, so as not to catch or impede the throw. The throwing end of the rope is fastened to a piece of wood B shaped like the but end of an oar, as no shape can be better devised for the purpose of throwing it from the hand. The person throwing it holds fast the reel in his other hand.

The cost of this is seven shillings and six-pence.

The reef safeguard consists of a rope or line thirty-five yards long, made fast at one end to a reel (A, fig. 3) six inches in diameter, and ten in length. To the other end of this rope, a brass or iron tinned ring, large enough to admit of the leather and buckle part of the shoulder-straps' passing through it is fastened. The other part consists of two straps B B, of strong sadler's web, 2 inches wide, crossing each other, and well sown together just above the pit of the stomach, and after leaving a sufficient space for admitting the arms, the ends on each side are fastened together. To the ends behind the left shoulder, a brass or iron tinned ring of an inch and half diameter is well fastened, and to the ends behind the right shoulder, a buckle and strap 18 inches long is fastened. If the space for the arms to pass through is proper, and the ring behind the left shoulder, and strap behind the right, properly placed, the pull from behind will be so equal, that the brace will neither press on the pit or stomach, or the windpipe; two essentials in swimming and diving. To insure this safeguard being put on properly, when hurry requires the use of it, "*Over the left arm,*" "*Over the right arm,*" should be written or stamped on the inside of the web part with printer's ink. The person using this, slips his arms into the brace, whilst another, having first passed the buckle and strap (which is at the end of the brace behind the right shoulder) through the ring at the end of the rope, puts the strap through the

ring behind the left shoulder, and buckles it to the size of the wearer. This person keeps fast hold of the reel, whilst the wearer plunges into the water; and the facility with which the rope runs off the reel, prevents its being any impediment either in swimming or diving.

When it is required to pull the person wearing it to the shore, it is not to be done by winding the rope on the reel, but by shortening the rope by passing one hand over the other as quick as possible. This will pull the wearer on his back, and from the elevated position of the person pulling, whether he is on shore or in a boat, the wearer's head and shoulders will be pulled out of the water, and prevents the immersion of his head either from debility, his efforts, or any weight he may have hold of.

The cost of this is eight shilling and six-pence.

Certificates were received from JOHN WING, Esq. Mayor of Bedford; Dr. G. YEETS; Mr. CHARLES SHORT, Surgeon; and Mr. P. NASH; stating that they had witnessed the experiments made by Mr. Miller's Drags, and are of opinion, that they are well calculated for quickly finding and raising the bodies of persons who have sunk under water, and that the escape of a body when once touched therewith seems almost impossible.